

REMARKS

Claims 1, 2, 4-6, 10-13 have been rejected under 35 U.S.C. §102(b) as being anticipated by Pollitt, WO 98/44033. Claims 1-8, 11-16 have been rejected under 35 U.S.C. §102(b) as being anticipated by Pollitt, GB 2,322,630. Additionally, claims 1-5, 9, 11-13 have been rejected under 35 U.S.C. §102(b) as being anticipated by Pollitt, WO 98/21159.

The Examiner's rejections are respectfully traversed.

As amended, the Applicant's invention is directed to a settable mixture comprising polybutadiene, a flow-enhancing liquid, and dry particulate matter. The dry particulate matter includes no more than 2% water content and is selected to have a maximum of 2% Aluminium Oxide, and a maximum of 1% Ferrous Oxide.

It is important in the Applicant's mixture that there be a maximum of 2% aluminium oxide and a maximum of 1% of the ferrous oxide based on weight of the sand. The specific low percentages were determined by the Applicant during attempts to solve a problem of the Applicant's originally constituted product. As indicated in the previous amendment, it was found that an undesirable oily sheen was left on the paving elements with which the mixture was used for pointing after the product has been stored in vacuum-sealed bags for some four to five weeks. Additionally, the setting times for the mixture increased dramatically from two and half hours to seven or eight hours. This is particularly undesirable since the compound "cures" upon exposure to the atmosphere, and it can not be subjected to rainfall until it has cured. Thus, the longer setting time makes it more difficult to use in conditions where rain may be expected.

The Applicant recognized that the staining of the surrounding pavement may be prevented by minimizing the content of aluminium oxide and ferrous oxide in the sand

mixture. Furthermore, by minimizing these two constituents, the setting time was shortened and the overall strength of the product was improved. The staining of the pavement and increased setting times are unacceptable problems and thus the Applicant overcame the problem by using sands selected to have a maximum of 2% aluminium oxide and a maximum of 1% ferrous oxide content.

It is important to note that if one were to order a silica sand without specifying the chemical constituents thereof it is probable, if not certain, that one would receive a sand with an excessive content of aluminium oxide and possibly a ferrous oxide. As indicated on the attached sheets, the content of aluminium oxide and ferrous oxide can vary greatly. In some instances the aluminium oxide are over 2% and some show almost 10%. Thus, if one used some of these sand products, the invention would not work.

On the other hand, the three cited references do not suggest or disclose the chemical compound as defined in the claims. None of the references mention the aluminium oxide or ferrous oxide content of the particular material. The Applicant points out that there is always some of both constituents in sands. Therefore, the Applicant in the present invention is not attempting to claim a settable material in which the sand has zero aluminium oxide or ferrous oxide. Rather, the Applicant is claiming that specific limitations must be imposed on the percentages of the constituents in order to prevent staining and improve setting times and overall strength. Additionally, at the times when those references were filed, there was no knowledge of the Applicant's problem and thus, no solution to the problem.

As independent claim 1 is patently distinguishable from the prior art references, the remaining claims dependent therefrom are also patently distinguishable.

In view of the foregoing, it is believed that the amended claims and the claims dependent there from are in proper form. The Applicants respectfully contend that Pollitt, WO 98/44033, Pollitt, GB 2,322,630 and Pollitt, WO 98/21159 do not anticipate the claimed invention under the provisions of 35 U.S.C. § 102(b). Thus, claims 1-9 and 11-13 are considered to be patently distinguishable over the prior art of record.

The application is now considered to be in condition for allowance, and an early indication of same is earnestly solicited.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Arlene J. Powers', is written over a horizontal line.

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**FOUNDRY &
INDUSTRIAL
SANDS**

TARMAC FOUNDRY PRODUCTS
WINDSOR ROSE SILICA SAND
GRADE 440

Source: Congleton, Cheshire. Description: Washed and graded dry silica sand.

Mechanical Analysis		Chemical Analysis	
Microns	% Retained (wt)		(%)
1000	0.11	SiO ₂	97.60
710	0.30	Fe ₂ O ₃	0.19 —
500	2.50	Al ₂ O ₃	1.14 —
355	19.00	K ₂ O	0.66
250	48.50	Na ₂ O	<0.05
212	18.50	CaO	0.05
180	7.80	MgO	<0.05
150	2.70	TiO ₂	0.06
125	0.46	L.O.I.	0.30
90	0.11		
63	0.02		
<63	trace		

Physical Properties

Average grain size	306
Base permeability	140 (Spec. 120-160)
Approx. bulk density	1530 Kg/cubic metre
Clay content	<0.20%
Grain shape	Angularity: Sub-rounded Sphericity: Medium to high

GRADE 417

Source: Congleton, Cheshire. Description: Washed and graded dry silica sand.

Mechanical Analysis		Chemical Analysis	
Microns	% Retained (wt)		(%)
1000	0.04	SiO ₂	97.50
710	0.09	Fe ₂ O ₃	0.23 —
500	0.99	Al ₂ O ₃	1.22 —

355	8.79	K ₂ O	0.69
250	38.69	Na ₂ O	<0.00
212	23.67	CaO	0.04
180	14.90	MgO	<0.05
150	9.14	TiO ₂	0.03
125	2.70	L.O.I.	0.28
90	0.90		
63	0.08		
<63	0.01		

Physical Properties

Average grain size	261
Base permeability	100 (Spec. 80-120)
Approx. bulk density	1550 Kg/cubic metre
Clay content	<0.20%
Grain shape	Angularity: Sub-rounded Sphericity: Medium to high

GRADE 406

Source: Congleton, Cheshire. Description: Washed and graded dry silica sand.

Mechanical Analysis		Chemical Analysis	
Microns	% Retained (wt)		(%)
1000	0.01	SiO ₂	96.00
710	0.02	Fe ₂ O ₃	0.32
500	0.15	Al ₂ O ₃	2.07
355	1.16	K ₂ O	1.30
250	17.20	Na ₂ O	0.00
212	24.04	CaO	<0.05
180	22.09	MgO	0.06
150	19.81	TiO ₂	0.05
125	9.60	L.O.I.	0.33
90	5.18		
63	0.67		
<63	0.06		

Physical Properties

Average grain size	192
Base permeability	55 (Spec. 40 - 70)
Approx. bulk density	1485 Kg/cubic metre
Clay content	<0.40%
Grain shape	Angularity: Sub-rounded Sphericity: Medium to high

TILCON HUTTENES ALBERTUS LTD
RESIN COATED SANDS

CORE PRODUCTION

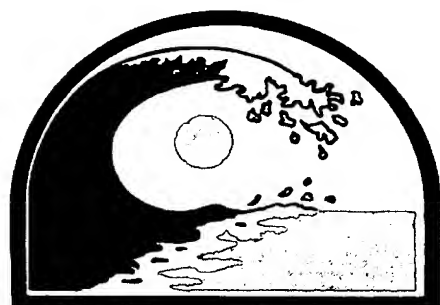
Grade	L.O.I. Range	Base Sand	Usage
LC	1.7%-3.5%	50	Non ferrous
GC	2.1%-5.4%	80	General purpose
SC	3.4%-5.0%	80	Core sand for steel casting
SC(LN)	3.4%-5.0%	80	Core sand for steel casting
THA	2.5%-4.5%	60 & 80	Special applications
K	1.7%-3.5%	50, 60 & 80	Improved knockout

MOULD PRODUCTION

Grade	L.O.I. Range	Base Sand	Usage
GM	3.5%-6.0%	80	General purpose
SM	3.5%-5.5%	80	Moulding sand for steel casting
SM(LN)	3.5%-5.5%	80	Moulding sand for steel casting

All moulding sands process excellent anti-crack properties

CONTACTS



PADSTOW SEA SAND

Chemical Makeup Information

Uses

History & Facts

Our Credentials

Testimonials

Contact Us



The Chemical Makeup

Padstow Sea Sand is a calcium enriched liming agent providing a constant plant food supply - ideal for lawn dressing, crops & plants which require light, well-drained soil.

Padstow Sea Sand is used for equestrian centres as well, due to its soft texture and natural surface, it is ideal for training horses.



[Click here to Enlarge](#)

Analysis of Padstow Sea Sand

Sea Sand Analysis by XRF:

Los on ignition	(LOI)	33.60%
Calcium Oxide	(CaO)	39.43%
Magnesium Oxide	(MgO)	2.15%
Aluminium Oxide	(Al ₂ O ₃)	1.81%
Iron Oxide	(Fe ₂ O ₃)	0.88%
Potassium Oxide	(K ₂ O)	0.42%
Sodium Oxide	(Na ₂ O)	0.45%
Phosphorus Pent oxide	(P ₂ O ₅)	0.08%
Silica	(SiO ₂)	21.91%
Titanium	(TiO ₂)	0.10%
Manganese Oxide	(MnO ₂)	0.03%

Trace Elements (PPM)

Nickel	(Ni)	13
Copper	(Cu)	9
Zinc	(Zn)	30
Gallium	(Ga)	2
Lead	(Pb)	4
Thorium	(Th)	0
Uranium	(U)	0
Vanadium	(V)	21
Chromium	(Cr)	29
Manganese	(Mn)	249
Barium	(Ba)	74
Lanthanum	(La)	9
Cerium	(Ce)	21
Cobalt	(Co)	nD
Arsenic	(As)	11
Selenium	(Se)	15

Sum Total: 101.19%

Water soluble elements by Ion Chromatography (PPM):

Chloride	(Cl)	18
Fluoride	(F)	D<
Sulphate	(SO ₄)	9
Iodide	(I)	10

(D = Detected < 1 ppm)

Sulphur Trioxide (SO₃) 0.4

Neutralising value as CaO = 40.7%



PRODUCTS OF COLOMBARA

Particle size analysis

Class	SAND 5	SAND 7	SAND 8
mm	%	%	%
> 2,0			1
> 1,0			3
> 0,5	10		8
> 0,2	46	9	21
< 0,2	44	91	67
Humidity	0,1 %	0,1 %	7 %

Chemical analyses

	SAND 5	SAND 7	SAND 8
Elements	%	%	%
SiO ₂	84	81	82
Al ₂ O ₃	7,6	9,3	8,7
Fe ₂ O ₃	0,5	1,1	0,9
K ₂ O	3,6	3,3	3,4
CaO	1,9	2,9	2,7
MgO	0,1	0,4	0,3
Na ₂ O	1,8	2,1	1,9
TiO ₂	0,1	0,2	0,1
Cr ₂ O ₃	0,006	0,007	0,007

CERAMICS: Sand 5, Sand 7, Sand 8



factory Colomb
main p:



SILICA SAND OF MOL

After mining, the silica sands of Mol - **M31**, **M32** and **M34** - are industrially processed: sieved, washed and classified. These qualities are available moist or dried; by truck, wagon or ship; in bulk or bagged (dried sands).

The silica sands of Mol are an excellent raw material for the glass-, crystal- and ceramic industry, for foundries, for tile glues, plasters, mortars, coatings etc...

GRANULOMETRIC DATA AND PHYSICAL CHARACTERISTICS

Method: ISO-sieving

	M31	M32	M34	
D50	370	260	170	µm
> 1000 µm	1			%
> 710 µm	5			%
> 500 µm	25			%
> 355 µm	53	7		%
> 250 µm	85	57	3	%
> 180 µm	98	93	30	%
> 125 µm			91	%
< 63 µm	traces	≤ 0.1	≤ 0.3	%
density	2.65	2.65	2.65	kg/dm ³
bulk density	1.6	1.5	1.4	kg/dm ³
hardness	7	7	7	Mohs
pH	7	7	7	
loss on ignition	0.15	0.15	0.15	%
colour L*	70	70	72	Minolta CM-3610d D65/10°
a*	2.63	2.79	1.93	
b*	9.58	9.82	7.76	

CHEMICAL ANALYSIS (XRF) %

	M31	M32	M34
SiO ₂	99.5	99.5	99.0
Fe ₂ O ₃	0.04	0.03	0.07
Al ₂ O ₃	0.20	0.20	0.60
TiO ₂	0.03	0.03	0.06
K ₂ O	0.03	0.05	0.30
CaO	0.01	0.01	0.02

The above given information is based on mean values. The typical properties and chemical analyses are intended as examples and are not to be considered as substitutes for actual testing and analyses in those situations where properties and chemical compositions are critical factors.

Sales and supplies will always be according to our general sales conditions.

CAS-Nr.: 14808-60-7

EINECS-Nr.: 238-878-4

MSDS available on request

ed.06

TDS.03.05.10 22/09/03 1/1



SILICA SAND MAM1S

After mining, the silica sand **MAM1S** is industrially processed, sieved, washed and classified after which it undergoes a chemical purification and a demineralization by flotation.

MAM1S is available either moist or dried.

Supplies, in bulk, are made by ship or by truck.

GRANULOMETRIC DATA AND PHYSICAL CHARACTERISTICS

Method: ISO-sieving

D50	205	µm
> 355 µm	0.4	%
> 250 µm	20	%
> 180 µm	86	%
> 125 µm	99	%
< 63 µm	traces	
density	2.65	kg/dm ³
bulk density	1.5	kg/dm ³
hardness	7	Mohs
pH	6.5	
loss on ignition	0.06	%
colour	L* 73 a* 2.07 b* 6.53	Minolta CM-3610d D65/10°

CHEMICAL ANALYSIS (XRF) %

SiO ₂	99.80
Fe ₂ O ₃	0.009
Al ₂ O ₃	0.040
TiO ₂	0.016
K ₂ O	0.006
CaO	0.005
Cr ₂ O ₃	0.00005

MINERALOGICAL INFORMATION

Andalousite - Kyanite - Sillimanite
 grains > 250 µm max. 1/100 g
 grains > 150 µm max. 10/100 g

The above given information is based on mean values. The typical properties and chemical analyses are intended as examples and are not to be considered as substitutes for actual testing and analyses in those situations where properties and chemical compositions are critical factors.

Sales and supplies will always be according to our general sales conditions.

CAS-Nr.: 14808-60-7

EINECS-Nr.: 238-878-4

MSDS available on request

ed.04

TDS.03.05.41 22/09/03 1/1

SILICA SAND MAM1

After mining, the silica sand **MAM1** is industrially processed, sieved and washed after which it undergoes a chemical purification.

This silica sand is available either moist or dried.

The supplies, in bulk, are made by ship or by truck.

GRANULOMETRIC DATA AND PHYSICAL CHARACTERISTICS

Method: ISO-sieving

D50	225	µm
> 355 µm	1	%
> 250 µm	22	%
> 180 µm	83	%
> 125 µm	99	%
< 63 µm	traces	

density	2.65	kg/dm ³
bulk density	1.5	kg/dm ³
hardness	7	Mohs
pH	6.5	
loss on ignition	0.07	%
colour	L* 73	Minolta CM-3610d
	a* 2.01	D65/10°
	b* 6.28	

CHEMICAL ANALYSIS (XRF) %

SiO ₂	99.8
Fe ₂ O ₃	0.01
Al ₂ O ₃	0.05
TiO ₂	0.02
K ₂ O	0.01
CaO	0.01
Cr ₂ O ₃	0.0001

The above given information is based on mean values. The typical properties and chemical analyses are intended as examples and are not to be considered as substitutes for actual testing and analyses in those situations where properties and chemical compositions are critical factors.

Sales and supplies will always be according to our general sales conditions.

CAS-Nr.: 14808-60-7

EINECS-Nr.: 238-878-4

MSDS available on request

ed.04

TDS.03.05.42 22/09/03 1/1

FEATURES AND BENEFITS

EMMETT, ID

GRANUSIL® Mineral Fillers are produced from high purity industrial quartz sands for a wide variety of industrial and contractor mixed applications which need a reliable silica contribution or require a chemically inert structural filler. Consistently uniform grain shapes and particle size distributions offer excellent placement, compaction and mechanical properties. High silica content combined with low level soluble ions, alkalis and alkaline oxides provide non-reactive service in most corrosive and exposed environments.

These durable monocrystalline structures resist abrasion in high traffic-excessive wear applications and provide the stability formulators seek in high solids emulsions, elastomerics, cemented and modified cementitious systems. GRANUSIL® is the preferred structural component in systems ranging from polymerized floor overlays to artificial sports turf.

All GRANUSIL® grades are processed and sized under rigid SPC and UNIMIN QIPSM statistical and quality assurance programs. The result is chemical purity and consistently uniform particle size distributions for predictable performance in either manufactured or site-prepared products.

PARTICLE SIZE ANALYSIS AND PROPERTIES

Mean Values. These Do Not Represent A Specification.

	Mesh ASTM E-11	2095	2075	4095	4075	4060	4010	7030
Typical Mean %	8	3.5	---	---	---	---	---	---
Retained on	16	70.5	12.9	.4	.2	.1	---	---
Individual Sieves	20	22.8	59.9	19.6	8.8	.3	---	---
	30	2.1	18.4	58.5	30.8	13.3	TR	---
	40	.8	7.1	19.5	50.4	70.4	12.4	.2
	50	.2	1.3	1.6	8.8	14.1	38.4	1.9
	70	.1	.3	.3	.7	1.2	28.7	38.7
	100	---	.1	.1	.2	.3	13.4	36.3
	140	---	TR	TR	.1	.2	6.0	19.2
	200	---	---	TR	TR	.1	.9	3.1
	PAN	---	---	---	---	TR	.2	.6

Grain Shape	Subangular	Visual
Hardness	7.0 Mohs	Mohs Scale
Moisture Content	<0.1%	ASTM C-566
Specific Gravity	2.65 g/cm ³	ASTM C-128
Bulk Density, aerated	92-95 lb/ft ³	ASTM C-29
Bulk Density, compacted	98-100 lb/ft ³	ASTM C-29

CHEMICAL ANALYSIS

Mean Values. These Do Not Represent A Specification.

Mean Percent by Weight

	<u>2095-2075</u>	<u>4095-7030</u>
Silicon Dioxide (SiO ₂)	90.484	87.263
Iron Oxide (Fe ₂ O ₃)	.095	.113
Aluminum Oxide (Al ₂ O ₃)	5.451	7.244
Calcium Oxide (CaO)	.358	.609
Titanium Dioxide (TiO ₂)	.016	.018
Magnesium Oxide (MgO)	.021	.024
Potassium Oxide (K ₂ O)	2.536	2.819
Sodium Oxide (Na ₂ O)	.714	1.672
Loss on Ignition (LOI)	.325	.238

ORDERING INFORMATION

Shipping Point: EMMETT, ID
ORIGINATING CARRIER: UNION PACIFIC

Availability: BULK, 100# BAGS, AND IBC'S
TRUCK AND RAIL

Unimin
UNIMIN CORPORATION

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WORLDWIDE 203-966-1306 • FAX 203-972-1378

Silica Sands • Ground Silica • Feldspar • Ball Clay • Kaolin • Nepheline Syenite • High Purity Quartz • Olivine • Microcrystalline Silica • Bentonite Clay • Dolomite

GRADE NUMBERS INDICATE RELATIVE VALUES OR RESULTS. THEY ARE NOT A SPECIFICATION OR WARRANTY OF PERFORMANCE.

HEALTH HAZARD WARNING: Prolonged inhalation of dust associated with the materials described in this data sheet can cause delayed lung injury including Silicosis, a progressive, disabling and sometimes fatal lung disease. IARC has determined that crystalline silica, inhaled from occupational sources, can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure. Follow OSHA or other relevant safety and health standards for the form of crystalline silica called Quartz. Current material safety data sheets, containing safety information, is available and should be consulted before usage.

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Silica/Silica Containing
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Emmett - Granusil (5/97)

Specialty Sand**Typical Specifications & Properties Typical Chemical Analysis**

Typical Screen Analysis - % Retained on U.S. Sieves

Product	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	Na ₂ O	CaO	MgO	K ₂ O	TiO ₂	LOI
#12	80.5	10.2	0.19	1.3	0.5	Tr	5.7	Tr	0.3
#16	83.9	8.1	0.18	1.2	0.5	Tr	4.3	Tr	0.6
#20	83.7	8.2	0.17	1.4	0.7	Tr	4.0	Tr	0.7
#30	82.1	9.2	0.24	1.8	1.1	0.1	3.7	0.1	0.8
#60	79.6	10.5	0.36	2.4	1.9	0.1	3.1	Tr	0.9
60M	74.7	14.0	0.22	3.5	2.6	0.1	3.0	Tr	0.9
60 Inds	79.6	10.5	0.36	2.4	1.9	0.1	3.1	Tr	0.8
#90	74.2	13.3	0.60	3.3	2.8	0.1	2.8	0.6	1.2
50W	82.9	8.9	0.20	1.5	0.8	0.1	3.9	0.1	0.6
Ortega Blend	74.9	14.1	0.38	3.4	2.6	0.1	3.0	0.3	0.8

8	12	16	20	30	40	50	70	100	140	200	270	Pan	AFS	Effct.Size	Unif.Coeff
3.0	79.3	17.0	0.5	0.1	-	-	-	-	-	-	-	0.1	9	1.2-1.3 mm	<1.5
-	2.9	28.0	51.2	15.6	1.8	0.4	-	-	-	-	-	0.1	13	0.65-0.75 mm	<1.6
-	-	0.1	8.5	62.4	26.9	1.9	0.1	Tr	-	-	-	0.1	24	0.45-0.55 mm	<1.5
-	-	-	-	1.2	20.5	58.8	18.2	1.2	Tr	Tr	-	0.1	39	0.3-0.4 mm	<1.5
-	-	-	-	0.1	0.8	18.3	66.4	11.6	2.5	0.3	-	0.1	66	0.11-0.15 mm	<1.8
-	-	-	-	-	0.8	3.7	19.8	43.8	26.0	5.6	0.2	0.1	70	0.10-0.15 mm	<1.8
-	-	-	-	0.2	0.9	4.1	23.5	39.3	25.7	5.9	0.3	0.1	70	0.10-0.15 mm	<1.8
-	-	-	-	-	Tr	0.1	6.3	29.1	33.6	19.0	5.9	6.0	102	0.07-0.10 mm	<1.8
0.1	3.2	11.5	15.1	19.3	19.5	15.8	13.5	1.5	-	-	-	0.5	36	n/a	n/a
-	-	-	-	-	0.2	5.5	36.4	38.1	15.1	3.7	0.1	0.1	58	n/a	n/a

Other Properties:**Acid Solubility: 0.4-0.6% - PH: 7.4 Specific Gravity 2.65 Hardness (Moh's Scale): 7.0****Warning !!****Industrial Sand products contain free silica. Do Not breathe dust.**

Prolonged, unprotected exposure may cause delayed lung injury(silicosis).

IARC studies have found limited evidence of lung cancer in humans.

Follow OSHA Safety and Health standards for crystalline silica (quartz).



Products

Home Page

The Group

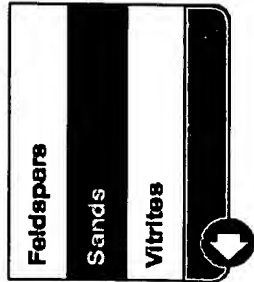
The Companies

The Products

Contacts

Products for Glassworks
Sands

- Chemical analysis
- Grain size distribution
- Mineralogical analysis



Chemical analysis (XRF)

	FLOS V3	FLOS V4	FLOS VS3	3/07	2/03	10/01
Oxides	%	%	%	%	%	%
SiO2	93.20	91.60	93.90	91.20	93.90	97.60
Al2O3	3.30	4.20	3.00	4.40	3.00	1.20
Fe2O3	0.025	0.040	0.020	0.08	0.030	0.009
TiO2	<0.01	0.01	<0.01	0.02	<0.01	0.005
CaO	0.25	0.25	0.25	0.04	0.02	0.10
MgO	0.01	0.02	0.01	0.02	0.02	0.01
K2O	2.75	3.40	2.40	3.70	2.50	0.90
Na2O	0.15	0.20	0.15	0.20	0.15	0.05
P.F. (1100°C)	0.20	0.25	0.20	0.20	0.20	0.10
C	/	/	/	/	/	/
S	/	/	/	/	/	/

Company	Sarda Silicati S.r.l.	Sasil S.p.A.
Plant	Ossi (SS) Piombino (LI)	Brusnengo (BI)

